

LAW OFFICES

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September 16, 2002

Via Hand Delivery

RECEIVED

Mr. William F. Caton  
Deputy Secretary  
Federal Communications Commission  
236 Massachusetts Avenue, NE  
Suite 110  
Washington, DC 20002

SEP 16 2002

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

Attn: International Bureau - Satellite Division

Re: Conforming Amendment to Application (FCC File No. 160-SAT-P/LA-97/13) pursuant to Commission's Report and Order (IB Docket No. 01-96, FCC 02-123)

Ladies and Gentlemen:

Enclosed on behalf of Denali Telecom, LLC is the Conforming Amendment to the above-referenced application filed in response to the amended rules as proposed in *The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ku-Band* (IB Docket No. 01-96; FCC 02-123; Adopted April 18, 2002; Released April 26, 2002). Accompanying this amendment is an FCC Form 312. In accordance with the Commission's rule 47 CFR §1.1114(a), no fee is required for this application, as it is filed for the sole purpose of modifying a pending application for authorization in order to comply with new or additional requirements imposed by the Commission.

Should any questions arise with regard to this filing, kindly communicate with the undersigned.

Yours very truly,  
PIERSON & BURNETT, LLP



David Lihani  
Attorneys for Denali Telecom

Enclosures  
Original + nine copies

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

In the Matter of	)	
	)	
The Establishment of Policies and	)	
Service Rules for the Non-Geostationary	)	FILE NOS. IB Docket No. 01-96;
Satellite Orbit, Fixed Satellite Service in the	)	
Ku-Band	)	
	)	
And	)	
	)	
DENALI TELECOM, LLC	)	
	)	
Conforming Amendment to Application	)	and, 160-SAT-P/LA-97(13)
For Authority to Launch and	)	
Operate the Pentriad Satellite	)	
System	)	

To: Chief, Satellite Policy Branch

**CONFORMING AMENDMENT**

Denali Telecom, LLC ("Denali"), by its attorneys and pursuant to the Commission's adoption of new service rules in its *Report and Order, IB Docket No. 01-96, released April 26, 2002*, hereby submits its conforming amendment in the above-captioned application proceeding as called for by the Commission.<sup>1</sup> On September 26, 1997, Denali filed an application for authority

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<sup>1</sup> "Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ku-Band," 67 Fed Reg. 55,508 (Aug. 16, 2002) (to be codified at 47 C.F.R. Part 25), per *In the Matter of The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ku-Band*, IB Docket No. 01-96, Adopted April 18, 2002, Released April 26, 2002; FCC 02-123.

to construct and operate the Pentriad satellite system.<sup>2</sup> The Pentriad satellite system proposed by Denali will operate in quasi-geostationary highly elliptical orbits ("HEO"), and utilize the Ku-band for space-to-Earth transmission.<sup>3</sup> The Commission has proposed to amend **Section 25.146 Licensing and operating authorization provisions for the non-geostationary satellite orbit fixed-satellite service (NGSO FSS) in the bands 10.7 GHz to 14.5 GHz**, and has requested the applicants to this licensing proceeding to submit conforming amendments to their respective applications. Denali, as an applicant affected by the proposed rule changes, provides the following additional information to satisfy the proposed amended regulation:

- (1) A demonstration that the proposed system is capable of providing fixed-satellite services on a continuous basis throughout the fifty states, Puerto Rico, and the U.S. Virgin Islands, U.S.; and*
- (2) A demonstration that the proposed system be capable of providing fixed-satellite services to all locations as far north as 70 deg. latitude and as far south as 55 deg. latitude for at least 75 percent of every 24-hour period.*

In order to comply with the Commission's requirement to provide for global coverage of services in the Ku-band, Denali amends its current application with the addition of the Southern

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<sup>2</sup> See, *In re Application of Denali Telecom LLC, Consolidated System Proposal for Authority to Launch and Operate Thirteen Satellites in the Pentriad System, an International Joint Venture Constellation of Thirteen Satellites Operating in Linked Molniya Highly-Elliptical Orbits in the International Fixed-Satellite Service and the Mobile Satellite Service* (filed September 26, 1997), FCC File No. 160-SAT-P/LA-97(13).

<sup>3</sup> Denali's application requests authority to construct and operate satellites in the international Pentriad system. The satellites will operate in linked Molniya highly elliptical orbits, and will provide international Fixed-Satellite services in the Ku-band (11.7-12.7 GHz) to users in the Northern and Southern Hemispheres. The Pentriad system will be the first commercial Western use of linked Molniya highly elliptical orbits.

Operation Configuration ("SOC") – covering the Earth's Southern Hemisphere. The SOC will service areas at 30 deg. west longitude (over the southern Atlantic Ocean) and 150 deg. east longitude (over Australia), and thus will be able to provide greater service capacity -- greater than what would have been available from its initial constellation design contained in the Denali application -- available to all Southern Hemisphere continents, including Antarctica. (See Exhibits 1 and 2 to the FCC Form 312 for Southern Hemisphere Service Area coverage).

This Pentriad system design continues to allow for the implementation of multiple systems in other Molniya orbits by maintaining spatial diversity between the operational arcs of the satellites (geosynchronous satellites at zero degrees Latitude plus or minus five degrees North and South and the Pentriad HEO satellites operating between 55 degrees South Latitude and 70 degrees North Latitude). Thus there is maintained an effective separation between GEO satellites and the operational arc of the Denali HEO satellites.

Services will be initiated in three phases: (1) an Initial Operation Configuration ("IOC") in the Northern Hemisphere; (2) a Full Operation Configuration ("FOC") in the Northern Hemisphere; and (3) a Southern Operation Configuration ("SOC") in the Southern Hemisphere. Denali is ready to proceed with the construction of the Pentriad system, so that the first three Pentriad spacecraft can be launched into an IOC to meet milestone dates (as to be specified by the Commission's authorization) to provide broadband services to North America and North Asia, and for subsequent deployment of the remainder of the constellation to follow for services to the Southern Hemisphere.

In the Southern Hemisphere, three satellites (Flight Models 13 to 15) will be launched into three distinct Molniya orbits (63 degree inclination) with 12.0 hour orbital periods. These satellites will be used to provide service to South America, Africa and Australia. The Southern Hemisphere coverage will be deployed after the IOC of the Northern Hemisphere. The FOC of the Northern Hemisphere will follow the Southern Hemisphere deployment.

In the FOC, all operational Pentriad satellites (Flight Models 1 through 15) will operate in six orbital planes. The three Northern and Southern orbital planes will be separated by one hundred twenty degrees (120°) around the equator of the Earth. The three operational satellites in each orbital plane will be spaced evenly in their respective plane. Operating together, the nine

operational satellites will provide continuous twenty-four (24) hour broadband coverage to five overlapping service areas in the Northern Hemisphere, while the three Southern Hemisphere satellites will provide services to the southern areas for at least 75 percent of every 24-hour period.

In-orbit spares (Flight Models 16-20) also will be launched into Molniya orbits with periods of approximately 9.6 hours. One satellite will orbit in each of the five orbital planes utilized by the operational satellites. If there is a failure of an operational satellite, the spare orbiting in the same plane will perform an orbital maneuver to change the orbital period to 14.4 hours and to maneuver into the same orbital phase as the failed satellite, to reconstitute full service by the system. In the worst case scenario, the replacement satellite will require 28.8 hours to replace a failed satellite and an additional 14.4 hour orbital period will be required to stabilize the orbit of the newly-operational spare. The total satellite outage during a worst case will be 43.2 hours, with single service outages of only eight hours in three separate service areas.

*(3) Sufficient information on the NGSO FSS system characteristics to properly model the system in computer sharing simulations, including, at a minimum, NGSO hand-over and satellite switching strategies, NGSO satellite beam patterns, NGSO satellite antenna patterns and NGSO earth station antenna patterns. In particular, each NGSO FSS applicant must explain the switching protocols it used to avoid transmitting while passing through the geostationary satellite orbit arc, or provide an explanation as to how the power-flux density limits in Section 25.208 are met without using geostationary satellite orbit arc avoidance. In addition, each NGSO FSS applicant must provide the orbital parameters contained in Section A.3 of Annex 1 to Resolution 46. Further, each NGSO FSS applicant must provide a sufficient technical showing to demonstrate that the proposed non-geostationary satellite orbit system meets the power-flux density limits contained in Section 25.208, as applicable.*

Denali's original application contained the information requested of this proposed addition to the Commission's rules.<sup>4</sup> The Pentriad system does not require, and Denali does not request,

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<sup>4</sup> See sections 3.3 and 4.2 of Denali's application, *supra* note 2.

an exclusive allocation of frequency spectrum in the Ku-band. The Pentriad system employs a novel system design that allows for multiple uses of the frequency spectrum. Because of the operational service arc of the satellites, Pentriad can operate, without interference, with satellites in the geostationary/ geosynchronous orbit using the same frequencies in both the Northern and Southern hemispheres coverage areas. The Northern and Southern Hemisphere Orbital Parameters (Exhibit 3) and the Link Budget (Exhibit 4) are appended to the FCC Form 312. Antenna Patterns for the Pentriad System data service are depicted for IOC (Exhibit 5) and FOC & SOC (Exhibit 6), with center position of Washington, D.C., and also appended to the FCC Form 312.

- (4) *A description of the design and operational strategies that it will use, if any, to mitigate orbital debris. Each applicant must submit a casualty risk assessment if planned post-mission disposal involves atmospheric re-entry of the spacecraft.*

The Pentriad System is designed to meet the requirements outlined in the USG Space Debris Mitigation Requirements. The communications payloads of the Pentriad design do not involve the planned release of any operational debris following the launch phase of operations. Denali also confirms that spacecraft shielding, placement of components, and use of redundant systems has been assessed to limit the probability that an operating spacecraft in the Pentriad system will become a source of debris through collisions with man-made objects or meteors. Denali further has assessed and will limit the probability of accidental explosion during and after completion of mission operations. The assessment was based on possible failure modes that could result in explosions, and operational procedures will be adopted to limit the probability they will occur. In addition, all sources of stored energy onboard the Pentriad spacecraft will have been depleted or contained in a "safed" mode when no longer required for mission operations or post-mission disposal.

Denali has estimated that its Pentriad system design and spacecraft mission profiles will limit the probability of collision with known large objects during the constellation's orbital

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lifetime. Denali's disclosure of the parameters (including the number of space stations, the number and inclination of orbital planes, orbital period, apogee, perigee the argument of perigee, and right ascension of the ascending nodes) used by the Pentriad system may assist third parties in identifying potential problems that may be the result of proposed operations, and lends itself to coordination between Denali and other operators located in similar orbits. Denali will be prepared to disclose the accuracy with which these orbital parameters will be maintained.

As a result of the perigee of the Northern hemisphere Pentriad satellites being over the vast Southern hemisphere oceans, atmospheric reentry is favored for spacecraft disposal at the end of mission life. For the Southern hemisphere satellites, the perigee will be over the northern hemisphere. For these Southern hemisphere satellites, Denali will perform a maneuver out of the Molniya plane that will cause the perigee to precess into the Southern hemisphere, at which time the spacecraft will deorbit and enter the atmosphere into the southern oceans. The spacecraft will be designed to eliminate and minimize debris released during normal operations by including sufficient fuel onboard each spacecraft to perform a deorbit burn, thereby hastening reentry and being presented with a risk of human casualty less than 1 in 10,000. Such calculation is predicated on results from the NASA Safety Standard guidance for computing casualty risk.<sup>5</sup>

Respectfully submitted,

DENALI TELECOM LLC

By



Dennis J. Burnett,  
President  
Pentriad North America, Inc.  
Manager of Denali Telecom, LLC  
1667 K Street, N.W., Suite 801  
Washington, D.C. 20006  
(202) 466-3044

David L. Lihani  
B. Elsa Woodall  
Pierson & Burnett, L.L.P.  
517 S. Washington Street  
Alexandria, VA 22314  
(703) 683-3044

Attorneys for Denali Telecom, LLC

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<sup>5</sup> "Guidelines and Assessment Procedures for Limiting Orbital Debris," NASA Safety Standard, NSS 1740.14, August 1995, [updated as NASA-STD-8719.14].

Certification that Conforming Amendment to the Application is True, Complete and Correct

Denali acknowledges that all of the statements in this Conforming Amendment to its Application and in the exhibits and associated attachments are considered material representations, and that all the exhibits and attachments are a material part hereof, and are incorporated herein as if set out in full in the Application.

The undersigned certifies individually and for Denali that the statements made in this Conforming Amendment to its Application are true, complete, and correct to the best of his knowledge and belief, and are made in good faith.

Denali Telecom, LLC

A handwritten signature in black ink, appearing to read "Dennis J. Burnett", is written over a horizontal line.

Dennis J. Burnett  
President, Pentriad North America, Inc.  
Manager of Denali Telecom, LLC

16 September 2002



PENTRIAD

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Engineering Certification

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this Conforming Amendment to the Application, that I am familiar with Part 25 of the Commission's Rules, that I have either prepared or reviewed the engineering information submitted in this Conforming Amendment to the Application, and that it is complete and accurate to the best of my knowledge and belief.

By:



Dr. Barton Huxtable  
User Systems, Incorporated

Dated: 16 September 2002

## **CERTIFICATE OF SERVICE**

I hereby certify that on the sixteenth day of September 2002, a true and correct copy of the foregoing Comments was sent via first-class mail, postage prepaid, or was hand-delivered, to each of the following:

Ms. Jennifer Gilsenan  
Chief, Policy Branch, Satellite Division  
International Bureau  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

Mr. Fern Jarmulnek  
Deputy Chief, Satellite Division  
International Bureau  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

Mr. Karl A. Kensinger  
Special Advisor, Satellite Division  
International Bureau  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

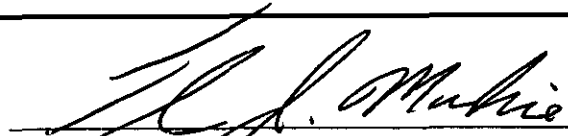
Mr. Thomas Tycz  
Division Chief  
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Mr. Donald Abelson  
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Ms. Cassandra Thomas  
Deputy Chief, Satellite Division  
International Bureau  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
Washington, DC 20554

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Thomas J. Mackie  
*Law Clerk, Pierson & Burnett, LLP*

Dated: September 16, 2002

## **APPENDIX 1**

### **FCC Form 312**

**FCC 312**  
**Main Form****FEDERAL COMMUNICATIONS COMMISSION****APPLICATION FOR SATELLITE SPACE AND EARTH STATION AUTHORIZATIONS**Approved by OMB  
3060-0678Est. Avg. Burden Hours  
Per Response: 11 Hrs.

FCC Use Only

File Number:

Call Sign:

Fee Number:

**APPLICANT INFORMATION**

1. Legal Name of Applicant <b>Denali Telecom, L.L.C.</b>		2. Voice Telephone Number <b>(703) 683 3044</b>	
3. Other Name Used for Doing Business (if any)		4. Fax Telephone Number <b>(703) 683 2044</b>	
5. Mailing Street Address or P.O. Box <b>517 South Washington Street</b>  <b>ATTENTION: Dennis J. Burnett</b>		6. City <b>Alexandria</b>	
		7. State / Country (if not U.S.A.) <b>Virginia</b>	8. Zip Code <b>22314</b>
9. Name of Contact Representative (If other than applicant) <b>David L. Lihani</b>		10. Voice Telephone Number <b>(703) 683 3044</b>	
11. Firm or Company Name <b>Pierson &amp; Burnett, L.L.P.</b>		12. Fax Telephone Number <b>(703) 683 2044</b>	
13. Mailing Street Address or P.O. Box <b>517 South Washington Street</b>  <b>ATTENTION: David L. Lihani</b>		14. City <b>Alexandria</b>	
		15. State / Country (if not U.S.A.) <b>Virginia</b>	16. Zip Code <b>22314</b>

**CLASSIFICATION OF FILING**

17. Place an "X" in the box next to the classification that applies to this filing for both questions a. and b. Mark only one box for 17a and only one box for 17b.			
<input type="checkbox"/> a1. Earth Station	<input type="checkbox"/> b1. Application for License of New Station	<input type="checkbox"/> b6. Transfer of Control of License or Registration	
<input checked="" type="checkbox"/> a2. Space Station	<input type="checkbox"/> b2. Application for Registration of New Domestic Receive-Only Station	<input type="checkbox"/> b7. Notification of Minor Modification	
	<input checked="" type="checkbox"/> b3. Amendment to a Pending Application	<input type="checkbox"/> b8. Application for License of New Receive-Only Station Using Non-U.S. Licensed Satellite	
	<input type="checkbox"/> b4. Modification of License or Registration	<input type="checkbox"/> b9. Letter of Intent to Use Non-U.S. Licensed Satellite to Provide Service in the United States	
	<input type="checkbox"/> b5. Assignment of License or Registration	<input type="checkbox"/> b10. Other (Please Specify):	
18. If this filing is in reference to an existing station, enter: Call sign of station:		19. If this filing is an amendment to a pending application enter: (a) Date pending application was filed: <b>9/26/97</b> (b) File number of pending application: <b>160-SAT-P/LA-97/13</b>	

## TYPE OF SERVICE

20. NATURE OF SERVICE: This filing is for an authorization to provide or use the following type(s) of service(s): Place an "X" in the box(es) next to all that apply.

- ☒ a. Fixed Satellite    ☐ c. Radiodetermination Satellite    ☐ e. Direct to Home Fixed Satellite  
☐ b. Mobile Satellite    ☐ d. Earth Exploration Satellite    ☐ f. Digital Audio Radio Service    ☐ g. Other (please specify) \_\_\_\_\_

21. STATUS: Place an "X" in the box next to the applicable status. Mark only one box.

- ☐ a. Common Carrier    ☒ b. Non-Common Carrier

22. If earth station applicant, place an "X" in the box(es) next to all that apply.

- ☐ a. Using U.S. licensed satellites    ☐ b. Using Non-U.S. licensed satellites

23. If applicant is providing INTERNATIONAL COMMON CARRIER service, see instructions regarding Sec. 214 filings. Mark only one box. Are these facilities:

- ☐ a. Connected to the Public Switched Network    ☐ b. Not connected to the Public Switched Network

24. FREQUENCY BAND(S): Place an "X" in the box(es) next to all applicable frequency band(s).

- ☐ a. C-Band (4/6 GHz)    ☒ b. Ku-Band (12/14 GHz)    ☐ c. Other (Please specify) \_\_\_\_\_

## TYPE OF STATION

25. CLASS OF STATION: Place an "X" in the box next to the class of station that applies. Mark only one box.

- ☐ a. Fixed Earth Station    ☐ b. Temporary-Fixed Earth Station    ☐ c. 12/14 GHz VSAT Network    ☐ d. Mobile Earth Station    ☒ e. Space Station    ☐ f. Other (Specify) \_\_\_\_\_

If space station applicant, go to Question 27.

26. TYPE OF EARTH STATION FACILITY Mark only one box.

- ☐ a. Transmit/Receive    ☐ b. Transmit-Only    ☐ c. Receive-Only

## PURPOSE OF MODIFICATION OR AMENDMENT

27. The purpose of this proposed modification or amendment is to: Place an "X" in the box(es) next to all that apply.

- ☐ a -- authorization to add new emission designator and related service
- ☐ b -- authorization to change emission designator and related service
- ☐ c -- authorization to increase EIRP and EIRP density
- ☐ d -- authorization to replace antenna
- ☐ e -- authorization to add antenna
- ☐ f -- authorization to relocate fixed station
- ☐ g -- authorization to change assigned frequency(ies)
- ☐ h -- authorization to add Points of Communication (satellites & countries)
- ☐ i -- authorization to change Points of Communication (satellites & countries)
- ☐ j -- authorization for facilities for which environmental assessment and radiation hazard reporting is required
- ☒ k -- Other (Please Specify)

Conforming Amendment to new FCC rules for Ku-band NGSN FSS

## ENVIRONMENTAL POLICY

28. Would a Commission grant of any proposal in this application or amendment have a significant environmental impact as defined by 47 CFR 1.1307?

If YES, submit the statement as required by Sections 1.1308 and 1.1311 of the Commission's rules, 47 C.F.R. §§ 1.1308 and 1.1311, as an exhibit to this application.

☐ YES

☒ NO

A Radiation Hazard Study must accompany all applications as an exhibit for new transmitting facilities, major modifications, or major amendments. Refer to OET Bulletin 65.

### ALIEN OWNERSHIP

29. Is the applicant a foreign government or the representative of any foreign government?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
30. Is the applicant an alien or the representative of an alien?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
31. Is the applicant a corporation organized under the laws of any foreign government?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
32. Is the applicant a corporation of which more than one-fifth of the capital stock is owned of record or voted by aliens or their representatives or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
33. Is the applicant a corporation directly or indirectly controlled by any other corporation of which more than one-fourth of the capital stock is owned of record or voted by aliens, their representatives, or by a foreign government or representative thereof or by any corporation organized under the laws of a foreign country?	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
34. If any answer to questions 29, 30, 31, 32 and/or 33 is Yes, attach as an exhibit, the identification of the aliens or foreign entities, their nationality, their relationship to the applicant, and the percentage of stock they own or vote.		

### BASIC QUALIFICATIONS

35. Does the applicant request any waivers or exemptions from any of the Commission's Rules? per 47 cfr 1,1114 (a) If Yes, attach as an exhibit, copies of the requests for waivers or exceptions with supporting documents. <del>new rules compliance</del>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
36. Has the applicant or any party to this application had any FCC station authorization or license revoked or had any application for an initial, modification or renewal of FCC station authorization, license, or construction permit denied by the Commission? If Yes, attach as an exhibit, an explanation of the circumstances.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
37. Has the applicant, or any party to this application, or any party directly or indirectly controlling the applicant ever been convicted of a felony by any state or federal court? If Yes, attach as an exhibit, an explanation of the circumstances.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
38. Has any court finally adjudged the applicant, or any person directly or indirectly controlling the applicant, guilty of unlawfully monopolizing or attempting unlawfully to monopolize radio communication, directly or indirectly, through control of manufacture or sale of radio apparatus, exclusive traffic arrangement or any other means or unfair methods of competition? If Yes, attach as an exhibit, an explanation of the circumstances.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
39. Is the applicant, or any person directly or indirectly controlling the applicant, currently a party in any pending matter referred to in the preceeding two items? If Yes, attach as an exhibit, an explanation of the circumstances.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
40. If the applicant is a corporation and is applying for a space station license, attach as an exhibit the names, addresses, and citizenship of those stockholders owning of record and/or voting 10 percent or more of the Filer's voting stock and the percentages so held. In the case of fiduciary control, indicate the beneficiary(ies) or class of beneficiaries. Also list the names and addresses of the officers and directors of the Filer. <span style="float: right;">see 160-SAT-P/LA-97/13</span>		
41. By checking Yes, the undersigned certifies, that neither the applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
42a. Does the applicant intend to use a non-U.S. licensed satellite to provide service in the United States? If yes, answer 42b and attach an exhibit providing the information specified in 47 C.F.R. § 25.137, as appropriate. If no, proceed to question 43.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
42b. What administration has licensed or is in the process of licensing the space station? If no license will be issued, what administration has coordinated or is in the process of coordinating the space station? <span style="float: right;">USA</span>		

43. Description. (Summarize the nature of the application and the services to be provided).

The FCC required this conforming amendment from Applicant in order to comply with the commission's adopted rules in Report & Order (IB Docket No. 01-96, FCC 02-123, adopted April 18, 2002 and released April 26, 2002) concerning (a) required coverage latitude on Earth (b) orbital parameters and characteristics and (c) disclosure of orbital debris mitigation plans, prior to receiving FCC authorization to operate

Exhibit No.	Identify all exhibits that are attached to this application.
1	Pentriad System Service Area: South America
2	Pentriad System Service Area: Australia
3	Denali Telecom, LLC Pentriad Orbital Parameters
4	Denali Telecom, LLC Pentriad Link Budget
5	Denali Telecom, LLC IOC Antenna Pattern for Ku-Band
6	Denali Telecom, LLC FOC & SOC antenna pattern for Ku-Band

#### CERTIFICATION

The Applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and requests an authorization in accordance with this application. The applicant certifies that grant of this application would not cause the applicant to be in violation of the spectrum aggregation limit in 47 CFR Part 20. All statements made in exhibits are a material part hereof and are incorporated herein as if set out in full in this application. The undersigned, individually and for the applicant, hereby certifies that all statements made in this application and in all attached exhibits are true, complete and correct to the best of his or her knowledge and belief, and are made in good faith.

44. Applicant is a (an): (Place an "X" in the box next to applicable response.)

☐ a. Individual ☐ b. Unincorporated Association ☐ c. Partnership ☐ d. Corporation ☐ e. Governmental Entity ☒ f. Other <sup>LLC</sup> (Please specify) L.L.C.

45. Typed Name of Person Signing

Dennis J. Burnett

46. Title of Person Signing

Manager, Denali Telecom, L.L.C.  
President, Pentriad North America, Inc.

47. Signature



48. Date

9.16.02

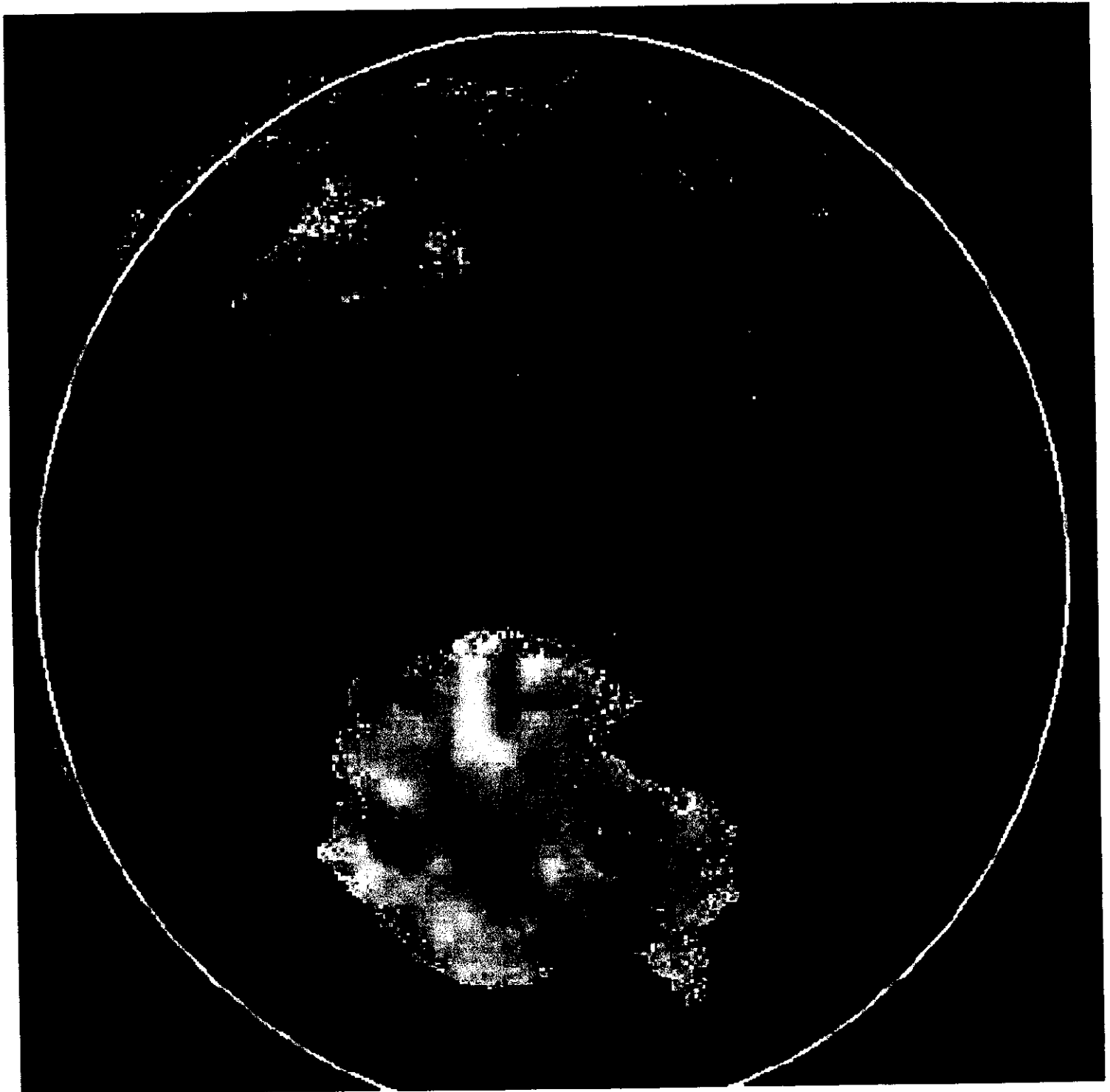
**WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).**



Exhibit 1: Pentriad System Service  
Area: South America



Exhibit 2: Pentriad System  
Service Area: Australia



Satellite	Period (sidereal hrs)	Inclination (degrees)	Eccentricity	Apogee Height (km)	Perigee Height (km)	Argument of Perigee (deg)	R. A. Ascending Node (degrees)	Mean Anomaly (degrees)
13	12.0	63.435	0.7133	39129	1237	90	90	324
14							210	84
15							330	204

**Exhibit 4: Denali Telecom, LLC,  
Pentriad Link Budget**

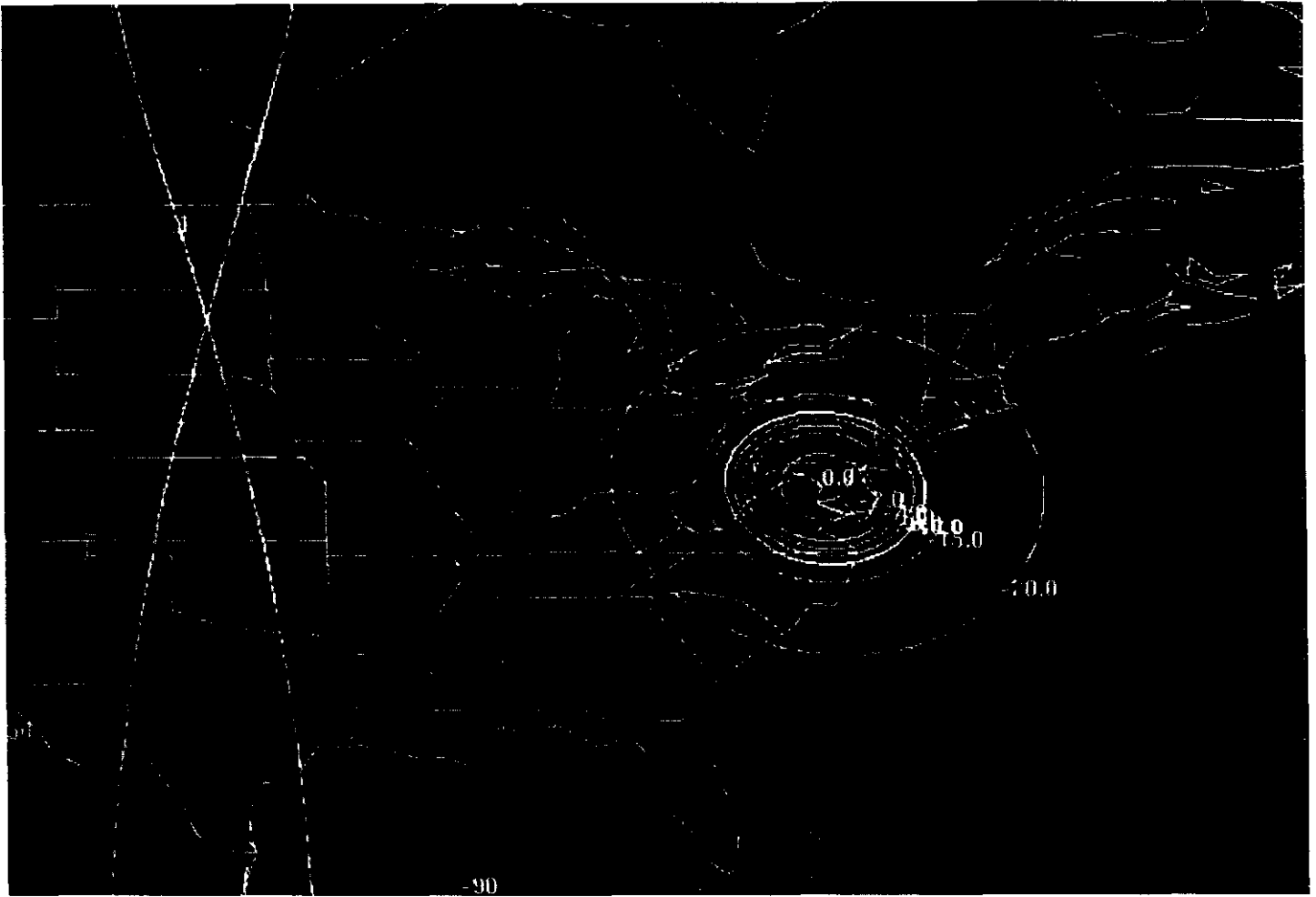
**Link Budget**

256K service to 20" tracking antenna; 24,000 home stations

		<u>Downlink</u>	<u>Uplink</u>
<b><u>Geometry</u></b>			
Range	R	43000	43000 km
<b><u>Signal</u></b>			
Carrier Frequency	f	13	13 GHz
Bit rate		0.262	0.262 Mbps
Bandwidth	BW	0.125	0.125 MHz
Spectral ratio		2.1	2.1 bps / Hz
<b><u>Path</u></b>			
Free space loss	$L_S$	207.4	207.4 dB
Atmospheric loss	$L_{atmo}$	1.5	1.5 dB
Edge of coverage loss	$L_{edge}$	1.0	1.0 dB
Other losses	$L_{other}$	1.0	1.0 dB
<b>Total path loss</b>	$L_P$	<b>210.9</b>	<b>210.9 dB</b>
<b><u>Transmitter</u></b>			
Power	$P_T$	-9.0	-7.0 dBW
Aperture diameter	$D_T$	2.000	0.500 m
Efficiency		0.75	0.5
Pointing loss		1.0	1.0 dB
Gain	$G_T$	46.5	32.7 dBi
	<b>EIRP</b>	<b>37.4</b>	<b>25.7 dBW</b>
<b><u>Receiver</u></b>			
System Noise Temperature	$T_S$	650	650 K
Aperture diameter	$D_T$	0.500	2.000 m
Efficiency		0.5	0.75
Pointing loss		1.0	1.0 dB
Gain	$G_R$	32.7	46.5 dBi
	<b>g/T</b>	<b>4.5</b>	<b>18.3 dB/K</b>
<b><u>Link Performance</u></b>			
Energy per bit	$E_b$	-195.0	-193.0 dB J
Noise spectral density	$N_0$	-200.5	-200.5 dB W/Hz
	$E_b/N_0$	5.5	7.5
Demodulation loss		1.5	1.5 dB
<b>Signal-to-noise ratio</b>	<b>SNR</b>	<b>4.0</b>	<b>6.0 dB</b>
<b>Minimum SNR</b>		<b>3.0</b>	<b>3.0 dB</b>
<b>Link Margin</b>		<b>1.0</b>	<b>3.0 dB</b>
Received power	$P_R$	-140.8	-138.8 dB W
Noise power	N	-149.5	-149.5 dB W
<b>Carrier-to-noise ratio</b>	<b>CNR</b>	<b>8.7</b>	<b>10.7 dB</b>
<b>Power flux density</b>	<b>PFD</b>	<b>-116.2</b>	<b>dB W/m<sup>2</sup>/MHz</b>
(No attenuation, no pointing loss)			

KU\_LINK to home (down).

Exhibit 5: Denali Telecom, LLC 10C  
Antenna Pattern for Ku-Band



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